A Study of Radon Concentration in Dwellings of Swelieh City by Application of Nuclear Track Detectors (NTDs) CR – 39

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ABSTRACT

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This study aimed to measure the natural radioactivity concentration in dwellings of Swelieh city (which has altitude about 1200 m above sea level). The study began in the April 15, 2003 and ended in October 15, 2003. The study area was divided into four regions: A, B, C and D. 195 passive dosimeters containing highly pure CR – 39 were distributed randomly among the dwellings of the different regions.

The indoor dosimeters were collected after three months. The collected detectors were chemically etched using 30 % KOH for 8 hours at 70° C. an optical microscope was used to measure the nuclear alpha track density on the detectors surfaces.

The results showed that radon concentrations affected by many factors, for example, the average concentration in
bedrooms was $(72 \pm 14 \text{ Bq/m}^3)$ while it was $(57\pm 11 \text{ Bq/m}^3)$ in living rooms. Moreover, the concentration was about $(83 \pm 12 \text{ Bq/m}^3)$ in rooms without ventilation while the concentration was about $(22 \pm 7 \text{ Bq/m}^3)$ at rooms ventilated more than 8 hours daily.

The study also showed that the concentration was relatively high $(80 \pm 16 \text{ Bq/m}^3)$ in buildings made of stones while concentration was low $(42\pm 11 \text{ Bq/m}^3)$ in the buildings made of blocks.

In addition, the concentration was different with increase in age of building, the averages were $(56 \pm 12 \text{ Bq/m}^3)$, $(44\pm 11 \text{ Bq/m}^3)$, $(30 \pm 10 \text{ Bq/m}^3)$ in more than 25 years, between 15 – 25 years and less than 15 years, respectively.

The results also showed that radon concentration was different with house locations, the averages were $(58 \pm 11 \text{ Bq/m}^3)$, $(74 \pm 15 \text{ Bq/m}^3)$, $(66 \pm 13 \text{ Bq/m}^3)$ and $(60 \pm 11 \text{ Bq/m}^3)$ in sectors A, B, C and D, respectively.

In general, the radon concentration in Swelieh city was found to be about $(58 \pm 14 \text{ Bq/m}^3)$. 

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